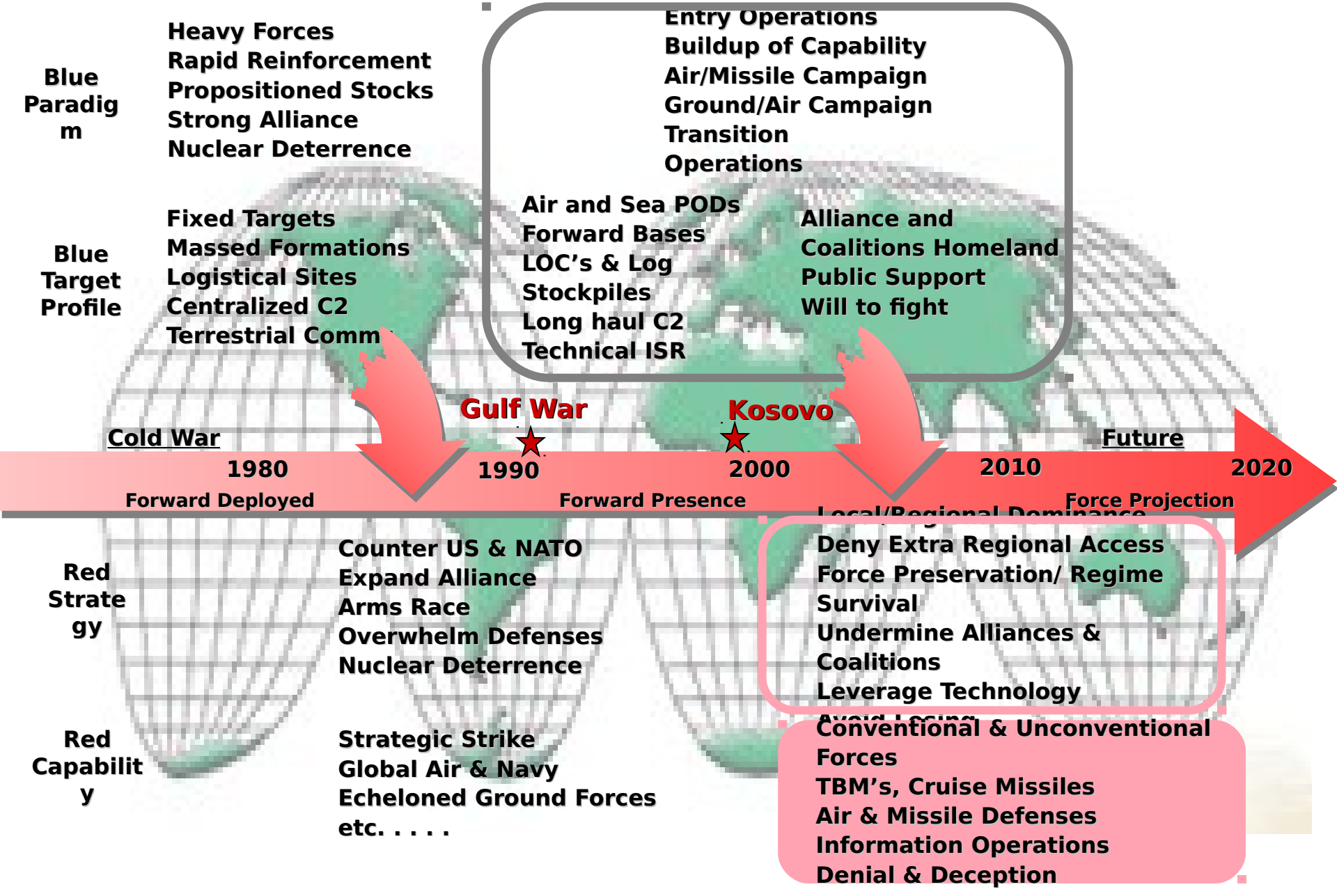
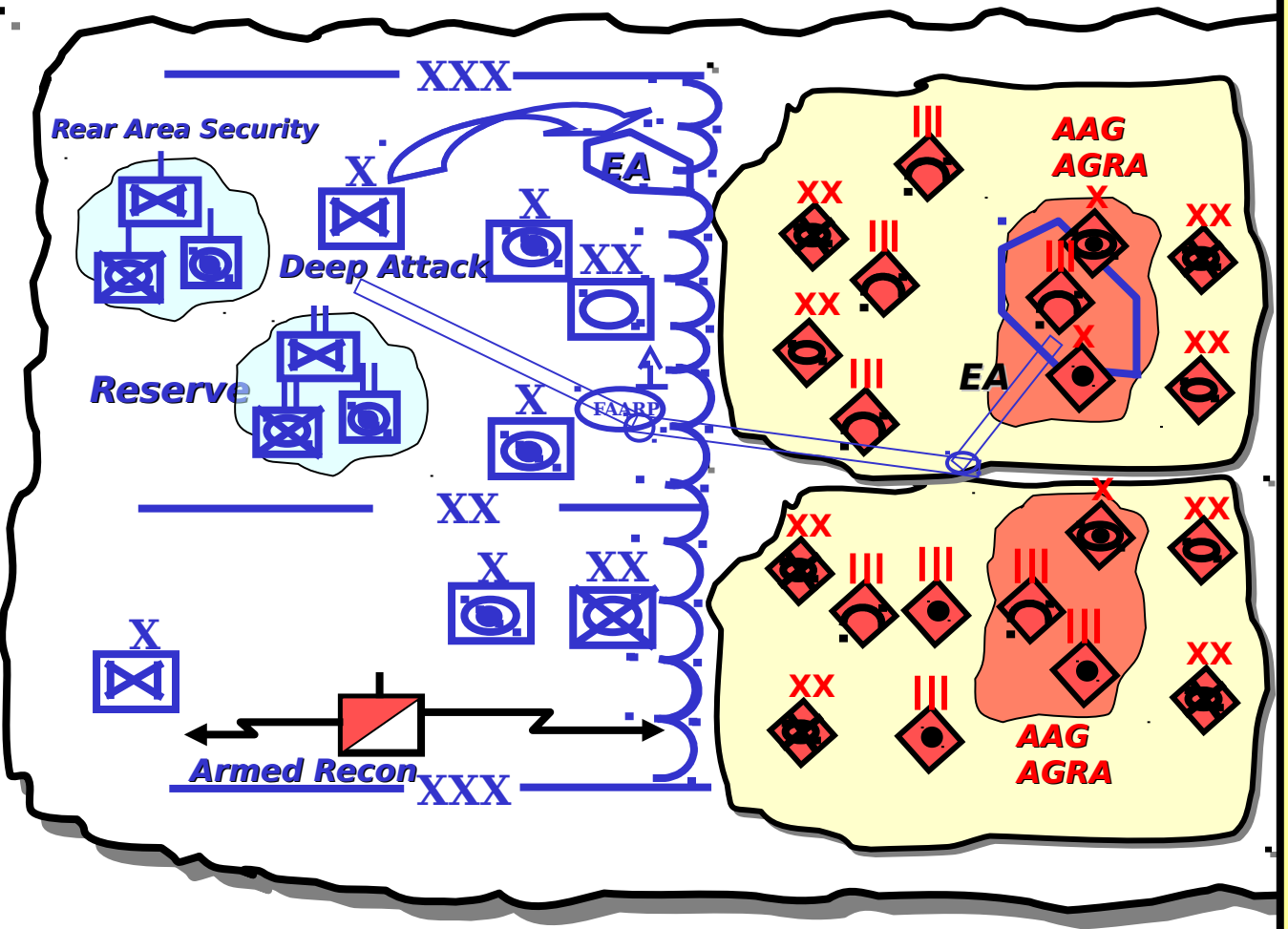
The Changing Strategic Paradigm



OLD PARADIGM

Defensive Counterattack **Offensive**



Roles

- Deep Operations
- Close Air Support
- Lift/Air Assault
- C2

Conditions

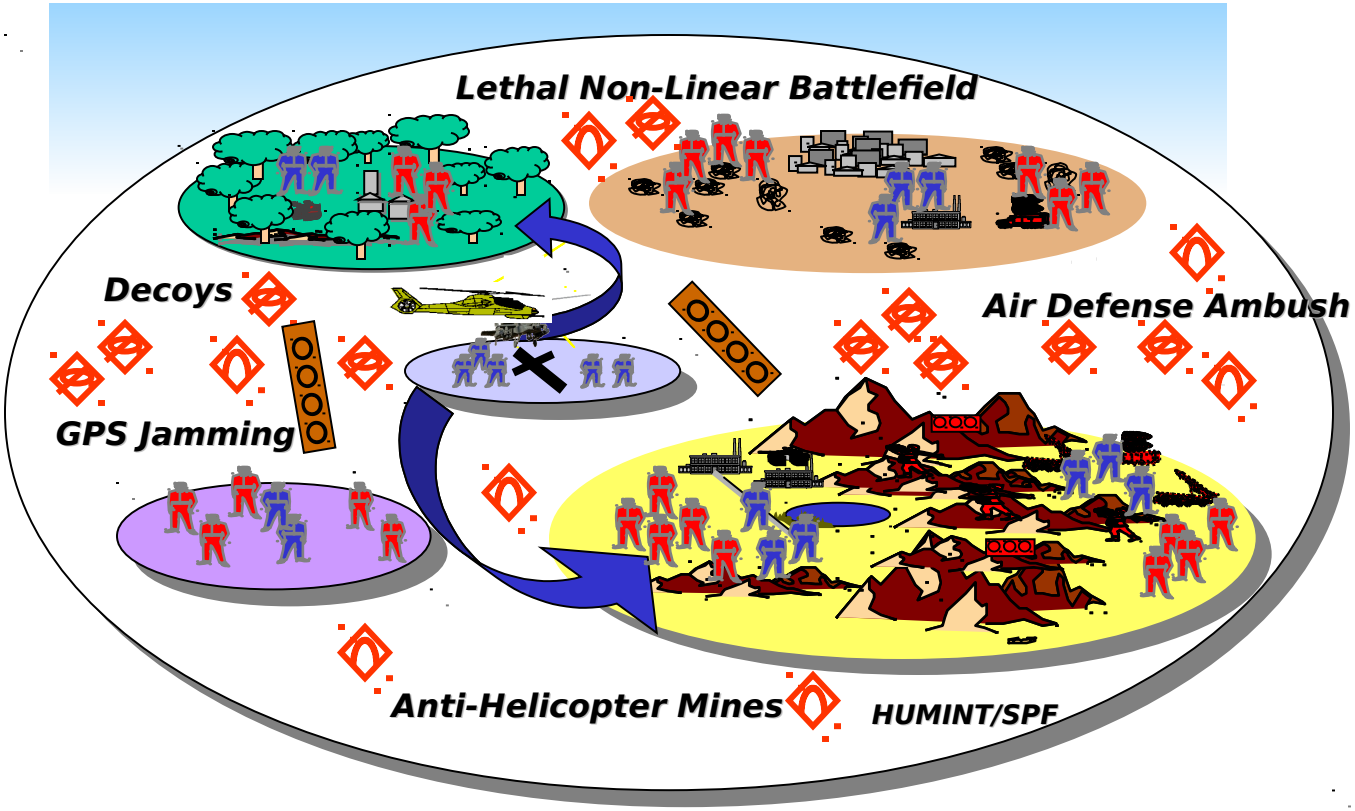
- Linear Battlefield
- Rear Areas (Sanctuary)
- Massed Formations
- Defensive ADA
- Area Lethal SEAD possible

Threats

- Air/Missile Attacks to Airfields
- SOF Attacks/WME
- Artillery/Rocket Attack
- IAD- Protecting Targets and Along Routes
- EW- Jamming Coms, Radars and GPS
- EMP
- Conventional, Non-Air Defense AD

NEW PARADIGM

Offensive **Defensive**



Recon Fires Complex
Recon Strike Complex
Military Systemology

Roles

- Deep Operations
- Close Air Support
- Lift/Air Assault
- C2

Conditions

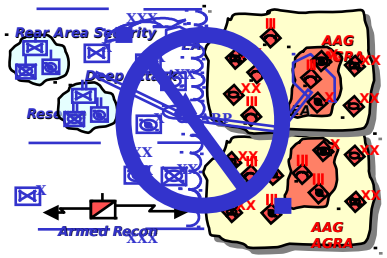
- Non-Linear Battlefield
- No Rear Areas (No Sanctuary)
- Offensive ADA
- Dispersed Targets
- Expanded ISR
- Precision SEAD Required

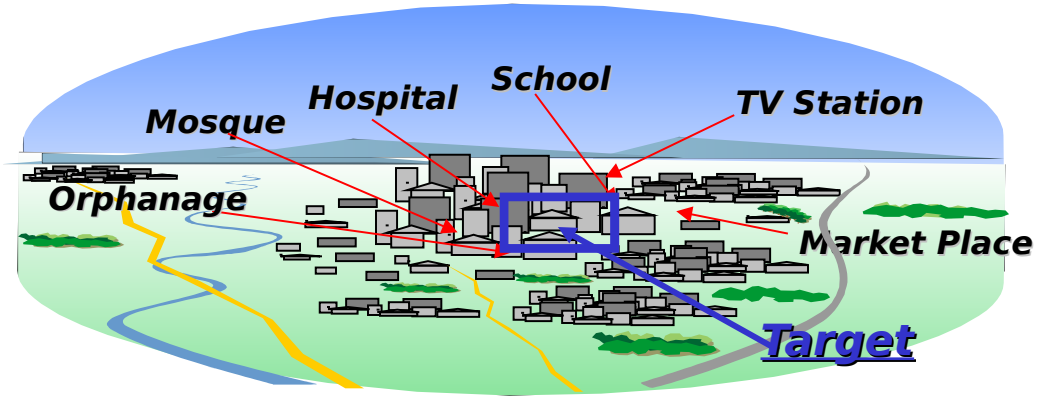
Threats

- Air/Missile Attacks
- WME
- Direct Fires
- SOF
- Artillery/Rocket Attacks
- Passive Sensors
- EW- Jamming Coms, Radars and GPS
- EMP

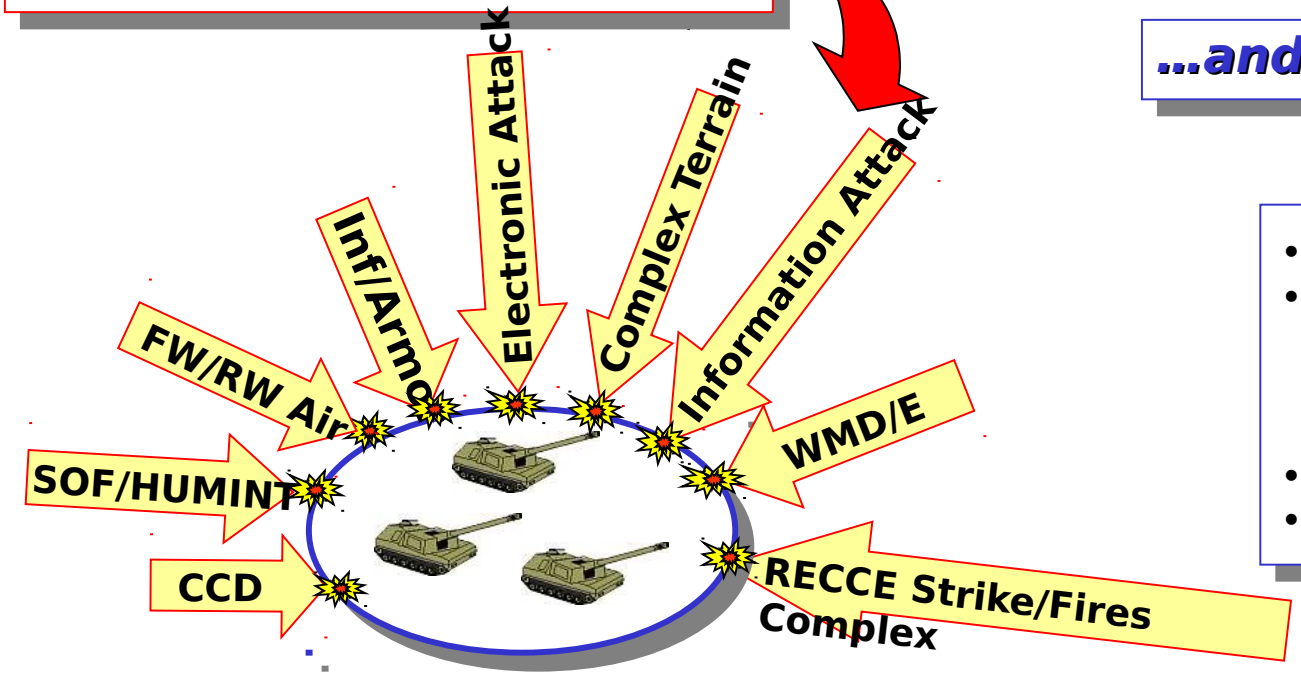
NEW PARADIGM PROBLEM SET

Leverage effects in the new operational environment….





Within these threat strategies…



…and survive

- Review Vulnerabilities
- Trade off analysis
  - Tactics
  - Leadership
  - Personnel
- Account for change of tactics
- Account for new technology

General Artillery Trends

WHY IT'S CHANGING

Applying Lessons Learned…
Adoptive and Adaptive

Multi Function Missile Systems

UAV

Target Acquisition Radars

Multiple Rocket Launchers

Improved Munitions

ATTACK HELICOPTER

AIRCRAFT

High

Proliferation Trends

Low

TODAY 2000 2015

Emerging Capabilities

Decreased Logistics

Advanced munitions

Enhanced targeting

INCREASING RISK TO US FORCES

Emerging Strategies

Opportunistic in nature

Redundant C3I

Dispersed, Integrated, and Decentralized engagement

Mixed automated and manual tracking-- win war of weather

Maximum use of complex terrain

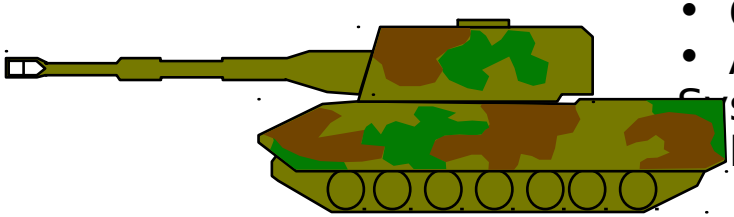
EVOLUTION CHARACTERIZED BY CHANGE IN THE TARGET SET

Artillery Trends

Increased Range

Cannon: 40 - 50 km
- 45-52 Caliber length tube
- Propellant - LPG

MRL: 50 - 90 km (max 150 km)



Decreased Engagement Time

- Direct Sensor to Shooter Link
  - UAV
  - IR, EO/MMW
- GPS / INS
- Automated Fire Control System (AFCS)
- Rate of Fire: 8-12 RPM

Accuracy & Lethality

Accuracy::
- Smart Munitions: small search area (hit probability >.5)

Lethality:
- Fuzing
- Explosive Fills (RDX & HMX)
- Controlled Fragmentation
- Improved Metallurgy
- ICM, DPICM, Scatterable Mines

Supportability

- Pallatized Ammunition
- Combustible cartridge
- 152 155 mm systems conversion
- Modular Propellant
- Multi-Option Fuzing

IMPLICATIONS: U.S. forces will face an enemy capable of conducting precision engagements at any place on the future battlefield.

State of the Art

2S31 120mm Combo Gun (RS)
GHN-45 155mm How (AU)
2S19 152mm SP How (RS)
G-6 155mm SP How (SF)
ASTROS II & III MRL (BR)

ADHPM

Laser Guided Projectile (LGP)
Sensor-Fuzed Munition (SFM)
Course-Corrected Munition (CCM)
Terminally Homing Munition (THM)

ADHPM - 2000 to 2015

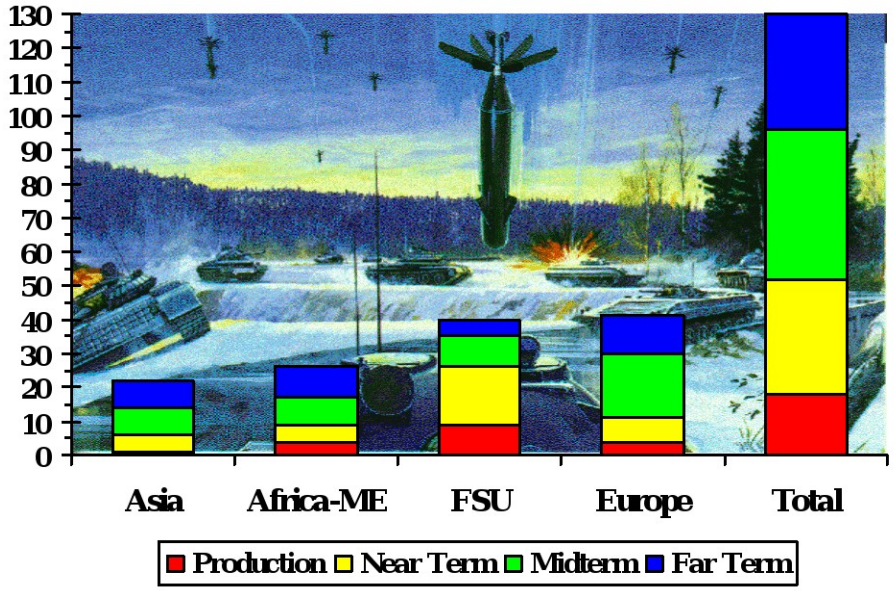
Krasnopol 152/155mmLGP (RS)
Hong Tu Di 152mm LGP (CH)
Kitolov 120/122mm LGP (RS)
Smel'chak 240mm LGP (RS)
Ugroza 122mm LG Rocket (RS,IR)
Bussard 120mm LG Mortar (GE)
Ukranian 120mm LG Mortar
Motiv 3M SFM (RS)
Universal 122, 220, 300mm SFM (RS)

MRL PROLIFERATION

The Poor Man's TBM

MRLs Provide Capability To Deliver Long Range Precision Munitions without TBMs

- LASER GUIDED PROJECTILES PROLIFERATING RAPIDLY
- FOUR NEW SENSOR FUZED MUNITIONS IN PRODUCTION
- COURSE CORRECTED MUNITIONS COMMON
- TERMINALLY HOMING MUNITIONS BEING TESTED



Strategies

Mobility
Massed Effects
Lethality..CML Capability
Sanctuary Operation

SRBM Trends

Guidance & Control:
- Active Attitude Control System
- Inertial Guidance w/Terminal Digital Correlation
- On-board Digital Flight Computer

Improved Warhead Options:
- Enhanced Blast
- NBC / Fuel Air Explosive
- Improved ICM
- Terminally Guided Homing
  - Subminitions
- Anti-radiation Homing
- On-board Target Acquisition
- Maneuvering

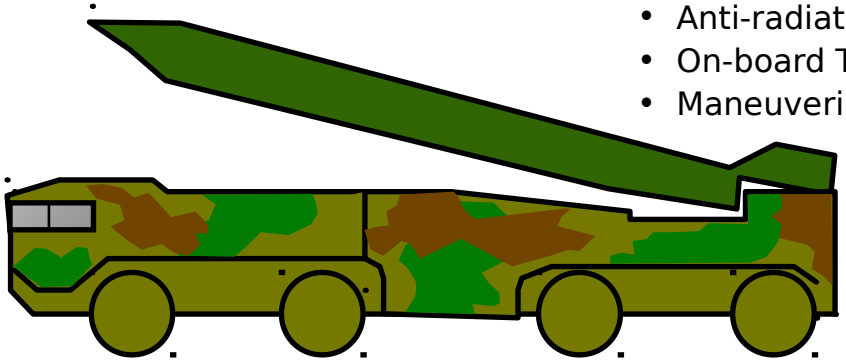
Most Common

FROG-7 (RS)
SCUD Variants
- SCUD-B (RS)
- Al Hussein (IZ)
- No-Dong (NK)

SS-21 (RS)

State of the Art

SS-21 (RS)
SCUD-B (RS)



Propulsion

Solid Fuel

Transporter Erector Launcher
- Survivability:
  - Low Observable Features
  - NBC protection
  - Lightweight armor
- Automated Fire Control
- SATCOM Digital Downlink: C3, GPS, TA, FD
- Shorter set-up time

Accuracy & Range:
- Range: Minimum 100 km
  Maximum 1000 km
- CEP: 10m at min range
  < 100m at max range

Staging

Multiple Stages

UAV - Trends

Attack UAV

- **TARGETS**
  - AIR DEFENSE RADARS
  - ARMOR
  - C2
- **PASSIVE SENSORS**
  - IR
  - RF SEEKERS
  - ACOUSTIC
- **SMALL WARHEADS**
  - HE - POSSIBLE CHEMICAL
  - FRAG - POSSIBLE BIOLOGICAL

- *40 + countries developing/using UAVs*
- *Difficult to detect, track, and destroy*
- *UAVs are proven force multipliers*

Strategies

Reduce Air Force Requirement
Near Real Time Intelligence
Degrade Digitized Battlefield
Preserve Force

Reconnaissance UAV

Electronic Warfare UAV

Dispensing Jammer/EMP Burst

Dedicated Comms Jammer

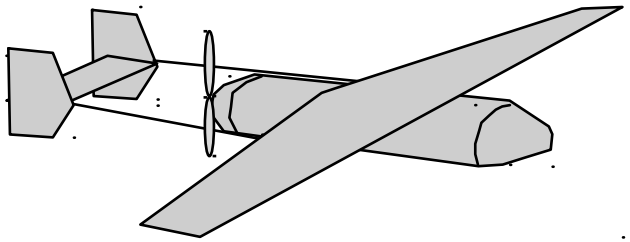
C4 & RSTA

Tactical Targeting:

- FLIRS widespread
- Day/night capable
- Electronic scan
- Phased Array Radar
- Seismic
- MMW radar

Deep Targeting:

- Extended range (500-1000km) UAV
- Multi-sensor suites
- Downlink



Communications Freq Hopping Radios

ACV 46 (SF)
ART 2000 (IR)
LVP 235 (IN)
PRC- 710 (IS)
SEM 173-193 CNR System (GE)

Automated Fire Control System

Kapustnik-B (RS)
Vivary (RS)
AS 2000 (SF)
BATES (UK)

Communications:

- COMSAT
- Cellular telephones
- Fiber-optics
- Spread-spectrum
- Frequency hopping
- Computerized support -
  - encryption

Satellites / Precision Navigation:

- GPS / INS
- Real time/near real time downlink -
  - Photo
  - Remote sensing
  - Data

UAV 50 to 100KM Range

ASN-104/105 (D-4) (CH)
Fox AT1 (FR)
AS 2000 (SF)
Brevel(FR/GE)
Vulture (SF)

UAV 100+KM Range

TU-143 Reys (DR-3) (RS)
Fox AT2 (FR)
CL-289 (CA)
Meteor Mirach 100 (IT)
Meteor Mirach 150 (IT)
Scout (IS)
Heron (IS)
Harpy (IS)

IMPLICATIONS: Foreign deployed rapid sensing, target acquisition, and communication systems pose a serious threat to U.S. forces ability to function effectively.

Aircraft Trends

- ***Increased Use Of PGMs/Cruise Missiles***
- ***Increased Stand-off Range***
- ***Reduced Radar Cross Section***
- ***Increased Aircraft Survivability***
- ***Increased Multi-role Variants***

Strategies

Regional Dominance
Potential Air Threat
Survivability vs Attack

AIRCRAFT CAN STILL REPRESENT A LETHAL THREAT..

Helicopter Trends

- ***Increased Stand-off Range***
- ***Improved Accuracy***
- ***Better Night & Adverse Weather Capability***
- ***Improved Aircraft Survivability Systems***
- ***Improved IR Signature Reduction Technology***

Strategies

Regional Overmatch
Reconnaissance
Limited Attack w/ Conditions

Attack Helicopters Are A Dangerous Threat To The Maneuver Force

Artillery Implications

Aviation Operational Environment Highlights:

- a wider spectrum of operations, increased threat technological capability and unpredictability leading to a more **complex and challenging range of operating environments** . .
- In association with an Adaptive and Adoptive Threat

- A Challenge for Independent Maneuver
- Suggests Combined Arms operations
- Extremely lethal, offensively oriented air defense environment
- Degradation of U.S. technological superiority
- Changed target sets
- Challenges US preferred method of Warfare….Standoff, Precision

Emerging Military Capabilities

Urban/Complex Terrain

Asymmetric Threats

Emerging Military Strategies